

ROGERS, 1998



DEPARTMENT OF THE AIR FORCE  
AIR FORCE MATERIEL COMMAND LAW OFFICE (AFMC)  
WRIGHT-PATTERSON AIR FORCE BASE OHIO

SFUND RECORDS CTR  
44944

OCT 30 1998

MEMORANDUM FOR:

Annie M. Jarabek  
EPA National Center for Environmental Assessment (MD-52)  
Research Triangle Park, NC 27711

SUBJECT: Perchlorate User and Production Information

Per your request, I am forwarding the attached correspondence for your use as a part of the internal peer review process. The information from Kerr McGee and American Pacific was requested by EPA Region IX. The documents forwarded are as follows:

- a. Listing of primary domestic AP users for propulsion applications
- b. Letter from American Pacific Corporation to Region IX (April 1998)
- c. Letter from Covington & Burling (Representing Kerr McGee) (April 1998)
- d. Table combining production information from b and c above

This information is being faxed for your use and a hard copy is being mailed to the address above. Please let me know if I can provide any additional material for your review.

Sincerely

  
DANIEL E. ROGERS, Lt. Col., USAF  
Environmental Law Directorate

## PRIMARY DOMESTIC AP USERS FOR PROPULSION APPLICATIONS

Produced at the request of AFMC LO/JAV - January, 1998

FACILITY NAME AND LOCATION	TYPE	AP-RELATED PRODUCTS
Air Force Research Laboratory (formerly Phillips Lab) OLAC PL/RK 5 Pollux Drive Edwards AFB CA 93524-7048	Government research laboratory for propulsion	Propellants and rocket motors
Alliant Techsystems Allegany Ballistics Laboratory 210 State Route 956 Rocket Center WV 26726 (304) 726-5000	Propulsion manufacturer/ subcontractor	Solid propellant tactical rocket motors and propellant production and research.
Alliant Techsystems Bacchus Works PO Box 98 Magna UT 84044 (formerly Hercules Aerospace) (801) 250-5911	Propulsion manufacturer/ subcontractor	Solid propellant strategic and space motors production and research. Recent AP reclamation pilot plant
Army Aviation & Missile Command Redstone Arsenal AL 35898 (205) 876-2151 (205) 876-1500	Government propulsion research lab	Solid propellant tactical motors and propellant research
Atlantic Research Corporation 5945 Wellington Road Gainesville VA 20155 (703) 754-5316	Propulsion manufacturer/ subcontractor	Production and research of solid propellant tactical motors, propellants, and plastic-bonded explosives containing AP
Atlantic Research Corporation PO Box 1036 Camden AR 70701 (501) 574-0610	Propulsion manufacturer/ subcontractor	Production of tactical solid propellant rocket motors
Industrial Solid Propulsion Inc. 1955 S. Palm St. Suite 15 Las Vegas NV 89104 (702) 641-2302	Manufacturer	Production of small solid propellant motors and gas generators
Gencorp Aerojet PO Box 13222 Sacramento CA 95813 (916) 351-8668	Propulsion manufacturer/ subcontractor	Production and research of solid propellant rocket motors, liquid propellant engines. Propellant washout facility.
NASA Marshall Space Flight Center AL 35812 (205) 544-2121	Government propulsion research lab	Solid propellant test motors
Naval Air Warfare Center Weapons Div 1 Administration Circle China Lake CA 93555 (760) 939-9011	Government propulsion research lab	Propellant and rocket motor research
Naval Surface Warfare Center Indian Head Div 101 Strauss Ave Indian Head MD 20640 (301) 743-4000	Government propulsion research lab	Propellant and rocket motor research, plastic- bonded explosives

Pratt & Whitney Space Propulsion Operations Chemical Systems PO Box 49028 San Jose CA 95161 (408) 776-9121	Propulsion manufacturer/ subcontractor	Production of solid propellant space and tactical motors
Talley Industries Inc. PO Box 849 Mesa AZ 85205	Propulsion manufacturer/ subcontractor	Production of small ejection rocket motors
Thiokol Corporation Utah DLV Operations and Space Operations PO Box 707 Brigham City UT 84302 (801) 863-3511 (facilities located near Promontory UT)	Propulsion manufacturer/ subcontractor	Production and research of solid propellant launch, strategic, and tactical rocket motors. Propellant washout/AP reclamation facilities
Thiokol Corporation Elkton DLV Operations PO Box 241 Elkton MD 21922 (410) 392-1429	Propulsion manufacturer/ subcontractor	Production and research of solid propellant space motors and propellants.
Universal Propulsion Company (unit of Talley Ind.) 25401 N. Central Ave Phoenix AZ 85027-9801 (602) 869-8067	Propulsion manufacturer/ subcontractor	Production of small boost and seat ejection solid propellant motors.
<b>FORMER FACILITIES</b>		
Alliant Techsystems McGregor TX 76657 (formerly Hercules, also Rocketdyne Solid Rocket Division of Rockwell prior to acquisition by Hercules)	Propulsion manufacturer/ subcontractor	Solid propellants and rocket motors (facility closed 1996).
California Institute of Technology Jet Propulsion Laboratory North Edwards CA	Propellant research lab	Solid propellant research and development (facility closed 1995).
Gencorp Aerojet Iuka MS	Propulsion manufacturer/ subcontractor to NASA	Space Shuttle Advanced Solid Rocket Motor (cancelled, facility closed 1993, subscale propellant manufacture only prior to shutdown)
Lockheed Propulsion Company Redlands CA (former Grand Central Rocket Co.)	Propulsion manufacturer/ subcontractor	Solid propellants and rocket motors 1961-1975
Thiokol Corporation Huntsville Division (at Redstone Arsenal AL)	Propulsion manufacturer/ subcontractor	Solid propellants and tactical and space rocket motors (facility closed 1996).

#### MAJOR AP SUPPLIERS FOR PROPULSION APPLICATIONS:

Western Electrochemical Company (WECCO), a subsidiary of American Pacific Corp.

PO Box 629

Cedar City UT 84720

Note: **Cedar City plant** in Iron County, UT was opened in 1989 following 1988 explosion at **former plant in Henderson, NV**; company known at that time as Pacific Engineering and Production Company (PEPCON). In 1992, WECCO quoted planned production quantities of 20 million lb per year.

Kerr-McGee Chemical Corp

Henderson NV

(headquarters Oklahoma City OK)

Note: Quoted production capacity of 40 million lb per year. However, in October 1997, Kerr-McGee announced the sale of its AP manufacturing business to American Pacific. Kerr-McGee retains the Henderson plants and will continue to produce other chemical products there.

Other companies that produced AP in large quantities in the 1960s include:

Hooker Chemical - plant location unknown (Hooker was taken over by Occidental Chemical Corp - may be able to get further information from Occidental at [www.oxychem.com](http://www.oxychem.com))

Pennwalt - plant location unknown (merged with Elf Atochem North America in 1989 - may be able to get more information from Elf through [www.elf-atochem.com](http://www.elf-atochem.com))

American Potash (acquired by Kerr-McGee in 1967)

#### RECOMMENDED REFERENCES:

Schilt, Alfred A., Northern Illinois University, *Perchloric Acid and Perchlorates*, published by the G. Frederick Smith Chemical Company, 867 McKinley Ave., Columbus OH 43223, 1979.

#### ADDITIONAL SUGGESTED CONTACT:

Bay Area Water Authority

San Jose CA

(Monitors water supply in proximity of United Technologies/Pratt & Whitney plant)

LICENSED:  
NEVADA, CALIFORNIA,  
DISTRICT OF COLUMBIA

**FRED D. GIBSON III**  
ATTORNEY AT LAW  
A PROFESSIONAL CORPORATION

TELEPHONE: (702) 735-2200  
TELEFAX: (702) 242-5024

SUITE 300  
3770 HOWARD HUGHES PARKWAY  
LAS VEGAS, NEVADA 89109

April 14, 1998

Mr. John Kemmerer  
Chief, Superfund Site Cleanup Branch  
Region IX  
United States Environmental Protection Agency  
75 Hawthorne Street  
San Francisco, CA 94105-3801

**HAND DELIVERED**

Dear Mr. Kemmerer,

Please consider this letter and the companion letter in which a claim for confidentiality of certain information has been made to be a response to your letter dated March 11, 1998, and received by American Pacific Corporation (the "Company") on March 16, 1998.

The Company has provided me with its answers and has done its best to be responsive and timely in its response. Please take special note that the series of explosions and fire the Company experienced on May 4, 1988, at its Henderson, Nevada production facility destroyed most of the Company's business records. Consequently, the historical information presented from December 1958 through May 1988 has been prepared and based upon all available documentation.

The Company's records reflecting its Cedar City, Utah business activity are complete and the Company's responses to questions pertaining to that activity are fully documented. The Company and I also request that we have the opportunity to supplement these responses or answer any questions if you believe such assistance would be helpful.

Respectfully submitted,

  
Fred D. Gibson III  
For American Pacific Corporation

### INFORMATION REQUEST - RESPONSES

#### Questions Concerning the former PEPCON Facility in Henderson, NV

1) What year did production of perchlorate-containing chemicals begin?

Response: December, 1958.

2) What entities have owned and/or operated the plant? Please provide the dates when ownership or operating control changed.

Response: Pacific Engineering and Production Co. of Nevada, PEPCON. In 1982 PEPCON was merged with American Pacific Corporation.

3) Which specific perchlorate-containing compounds were manufactured?

Response: Ammonium Perchlorate, Sodium Perchlorate.

4) What was the total annual production of perchlorate-containing compounds at the plant in Henderson, Nevada? What was the annual production of each specific perchlorate containing compound?

Response: See Attachment A.

5) What were the end uses of the perchlorate-containing compounds (solid rocket fuel, pyrotechnics)?

Response: Oxidizer component in solid rocket fuel. Component in explosive.

6) What was the approximate percentage of production sold for each of the end uses?

Response: 99% Oxidizer. 1% Explosive component.

7) Please provide the name and address of each entity to whom perchlorate-containing compounds were shipped each year from the former PEPCON facility. (more than 500 pounds in any year)

Response: See Attachment B.

#### Questions Concerning Other American Pacific Production Facilities and Other Producers

8) Please identify the locations of other perchlorate-containing chemical production facilities in the United States that are owned, operated or previously owned or operated by American Pacific including the WECCO plant in Cedar City, Utah.

Response: PEPCON, Henderson, Nevada - 1959 - 1988.  
WECCO, Cedar City, Utah - 1989 - Present.

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9) Please provide answers to the above questions (1 through 7) for any other American Pacific facilities producing or previously producing perchlorate-containing compounds.

**Response: As Follows.**

Questions Concerning the WECCO Facility in Cedar City, Utah

(1) What year did production of perchlorate-containing chemicals begin?

**Response: 1989.**

(2) What entities have owned and/or operated the plant? Please provide the dates when ownership or operating control changed.

**Response: WECCO is a wholly owned subsidiary of American Pacific Corporation.**

(3) Which specific perchlorate-containing compounds were/are manufactured?

**Response: Ammonium Perchlorate. Sodium Perchlorate Solution. Anhydrous Sodium Perchlorate. Potassium Perchlorate.**

(4) What was the total annual production of perchlorate-containing compounds at the plant in Cedar City, Utah? What was the annual production of each specific perchlorate containing compound?

**Response: See Attachment C.**

(5) What were the end uses of the perchlorate-containing compounds (solid rocket fuel, pyrotechnics etc.)?

**Response: Oxidizer in solid rocket fuel. Component in explosive. Pyrotechnic. Air bag inflator component. Curing agent.**

(6) What was the approximate percentage of production sold for each of end uses?

**Response: Oxidizer - 92%  
Explosive - 7%  
Other - 1%**

(7) Please provide the name and address of each entity to whom perchlorate-containing compounds were shipped each year from the WECCO facility. (more than 500 pounds in any year)

**Response: See Attachment D.**

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10) EPA has been informed that production of perchlorate-containing compounds in the US is limited to WECCO in Cedar City, Utah (formerly the PEPCON facility in Henderson, Nevada) and Kerr-McGee. Please confirm, to the best of your knowledge, whether this information is accurate. If you do have knowledge of perchlorate-containing compound production plants in the US other than those owned or operated by American Pacific or Kerr-McGee, please provide the names, locations and years of operation, if known.

Response: GFS, George Frederick Smith, Columbus, Ohio since 1928. Perchlorates and perchloric acid. Mailing Address: P.O. Box 245, Powell, OH 43065.

Internet:

<http://www2.thomasregister.com/ss/.409911604/olc/gfschem/gfscat.htm> and page /ss/.1223160775/olc/gfschem/gfshist.htm (perchlorates are found on these pages)

ATTACHMENT A

Question 4: What was the total annual production of perchlorate-containing compounds at the plant in Henderson, Nevada? What was the annual production of each specific perchlorate containing compound?

Response: The business records of American Pacific were destroyed as a result of the fire and explosions which occurred May 4, 1988. Based on information available the production of perchlorate products has been reconstructed. For years when the data is less certain the production is estimated and is identified with the letter "e." Nevertheless, we believe that for the purpose of responding to this question the following table is responsive.

<u>Fiscal</u> <u>Year</u>	<u>Perchlorates (lbs.)*</u>	
	<u>Ammonium</u>	<u>Sodium</u>
1959	1,214,000	---
1960	2,500,000e	---
1961	3,900,000e	---
1962	8,275,000	---
1963	15,306,000	---
1964	11,780,000	---
1965	3,795,000	---
1966	6,095,000	---
1967	3,450,000	---
1968	2,070,000	---
1969	5,427,000	---
1970	4,256,000	---
1971	10,768,000	---
1972	11,730,000	---
1973	8,855,000	---
1974	6,900,000	---
1975	4,370,000	---
1976	3,565,000	---
1977	3,910,000	---
1978	3,816,000	---
1979	5,000,000e	---
1980	5,154,000e	---
1981	8,571,000e	---
1982	13,333,000e	---
1983	13,551,000e	---
1984	13,736,000e	---
1985	14,600,000	---
1986	13,981,000e	56,000e
1987	14,344,000e	112,000e
1988	9,649,000e	56,000e

\*Data are rounded to the nearest thousand pounds.

ATTACHMENT B

Question (7): Please provide the name and address of each entity to whom perchlorate-containing compounds were shipped each year from the former PEPCON facility. (more than 500 pounds in any year)

Response: The records were destroyed in 1988. Therefore, the list has been reconstructed based on the best information available. The list identifies customers over periods of greater than one year. This list combined with the list in response to the same question for the WECCO facility is believed to be sufficient.

<u>Year</u>	<u>Customer</u>
1959 - 1965	Aerojet General - Highway 50 and Hazel Avenue, Rancho Cordova, CA 95670 Thiokol - Hwy 83 Bldg M-3 Receiving, Thiokol, Utah 84302
1964 - 1988	UTC - 600 Metcalf Road, San Jose, CA 95318 Thiokol - as above.
1985 - 1988	UTC - as above. Thiokol - as above. ARC - Highland Industrial Park, East Camden AR 71701
1986 - 1988	Brazil Europe

Printed 3/30/98

## Perchlorate Shipments

For Customers Exceeding 500 Pounds in Any Fiscal Year  
Fiscal Year Ending September 30, 1989 to 1998

Customer	Address
----------	---------

Fiscal Year Ending September 30, 1989:

ARC	Highland Industrial Park, East Camden AR 71701
Thiokol Corporation	Hwy 83 Bldg M-3 Receiving Thiokol UT 84302
UTC	600 Metcalf Road, San Jose CA 95138

Fiscal Year Ending September 30, 1990:

Aerojet	Highway 50 and Hazel Avenue Rancho Cordova, CA 95670
---------	--

ARC	Highland Industrial Park, East Camden AR 71701
Failure Analysis	1850 Finnacle Peak Road, Pheonix, AZ 85027

Hercules	Niro Plant, 7900 West 4100 South, West Valley City, UT 84120
----------	--

Thiokol-Space	Hwy 83 Bldg M-3 Receiving Thiokol UT 84302
UTC	600 Metcalf Road, San Jose CA 95138

Fiscal Year Ending September 30, 1991:

Aerojet	Highway 50 and Hazel Avenue Rancho Cordova, CA 95670
---------	--

ATTACHMENT D

# Perchlorate Shipments

For Customers Exceeding 500 Pounds in Any Fiscal Year  
Fiscal Year Ending September 30, 1989 to 1998

Customer	Address
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Thiokol-Space	Hwy 83 Bldg M-3 Receiving Thiokol UT 84302
Thiokol-Strategic	Bldg M3 Receiving Hwy 83, Brigham City UT 84302
Thiokol-Strategic	Hwy 83 Bldg M-3 Receiving Thiokol UT 84302
Thiokol-Tactical	Hwy 83 Bldg M-3 Receiving Thiokol UT 84302

Fiscal Year Ending September 30, 1992:

Aerojet	Highway 50 and Hazel Avenue Rancho Cordova, CA 95670
---------	--

Thiokol-Space UTC	Hwy 83 Bldg M-3 Receiving Thiokol UT 84302 600 Metcalf Road, San Jose CA 95138
----------------------	---

Fiscal Year Ending September 30, 1993:

Aerojet	Highway 50 and Hazel Avenue Rancho Cordova, CA 95670
ARC	Highland Industrial Park, East Camden AR 71701

ATTACHMENT D

Printed 3/30/88

**Perchlorate Shipments**  
For Customers Exceeding 500 Pounds in Any Fiscal Year  
Fiscal Year Ending September 30, 1989 to 1998

Customer	Address
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Hercules

Bldg 55 Baccus Works, Magna UT 84044

Thiokol-Space  
UTC

Hwy 83 Bldg M-3 Receiving Thiokol UT 84302  
600 Metcalf Road, San Jose CA 95138

Fiscal Year Ending September 30, 1994:

Aerojet  
ARC

Highway 50 and Hazel Avenue Rancho Cordova, CA 95670  
Highland Industrial Park, East Camden AR 71701

Thiokol-Space

Hwy 83 Bldg M-3 Receiving Thiokol UT 84302

UTC

600 Metcalf Road, San Jose CA 95138

# Perchlorate Shipments

For Customers Exceeding 500 Pounds in Any Fiscal Year  
Fiscal Year Ending September 30, 1989 to 1998

Customer	Address
----------	---------

**Fiscal Year Ending September 30, 1995:**

Aerojet	Highway 50 and Hazel Avenue Rancho Cordova, CA 95670
Alliant TechSystems	Niro Plant, 7900 West 4100 South, West Valley City, UT 84120

ARC	Highland Industrial Park, East Camden AR 71701
-----	--

Thiokol-Space	Hwy 83 Bldg M-3 Receiving Thiokol UT 84302
---------------	--

**Fiscal Year Ending September 30, 1996:**

Aerojet	Highway 50, and Hazel Ave, Rancho Cordova CA 95670
Alliant TechSystems	Niro Plant, 7900 West 4100 South, West Valley City, UT 84120
ARC	Highland Industrial Park, East Camden AR 71701

ATTACHMENT D

Printed 3/30/98

# Perchlorate Shipments

For Customers Exceeding 500 Pounds in Any Fiscal Year  
Fiscal Year Ending September 30, 1989 to 1998

**Customer****Address**

Thiokol-Space

Hwy 83 Bldg M-3 Receiving Thiokol UT 84302

Fiscal Year Ending September 30, 1997:

Alliant TechSystems  
ARCNiro Plant, 7900 West 4100 South, West Valley City, UT 84120  
Highland Industrial Park, East Camden AR 71701

ATTACHMENT D

Thiokol-DLV  
Thiokol-Elkton  
Thiokol-SpaceBldg M-345 Receiving, Brigham City, UT 84302-0689  
55 Thiokol Road, Elkton, MD 21921  
Hwy 83 Bldg M-3 Receiving Thiokol UT 84302

Printed 3/30/98

## Perchlorate Shipments

For Customers Exceeding 500 Pounds in Any Fiscal Year  
Fiscal Year Ending September 30, 1989 to 1998

Customer	Address
----------	---------

Fiscal Year Ending September 30, 1998:

Aerojet	Highway 50 and Hazel Avenue, Gate 1 Rancho Cordova, CA 95670
Alliant TechSystems	Niro Plant, 7900 West 4100 South, West Valley City, UT 84120
ARC	Highland Industrial Park, East Camden AR 71701

Thiokol-Elkton  
Thiokol Space

55 Thiokol Road Elkton, MD 21921  
Building M-345 Receiving Brigham City, UT 84302-0689

ATTACHMENT D

**COVINGTON & BURLING**

(201) PENNSYLVANIA AVENUE, N. W.

P.O. BOX 7566

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FACSIMILE: 44-171-495-3101

KUNSTLAAN 44 AVENUE DES ARTS

BRUSSELS 1040 BELGIUM

TELEPHONE 32-2-549-5230

FACSIMILE 32-2-502-1598

April 17, 1998

**VIA FEDERAL EXPRESS**

John Kemmerer  
Chief, Superfund Site  
Cleanup Branch  
U.S. Environmental Protection Agency  
Region IX  
75 Hawthorne Street  
San Francisco, CA. 94105-3901

Dear Mr. Kemmerer:

This letter responds to your request of March 11, 1998, to Patrick Corbett of Kerr-McGee Chemical LLC (KMCLLC), successor via merger to Kerr-McGee Chemical Corporation, seeking information pursuant to Section 104(e) of CERCLA and Section 3007 of RCRA regarding production and use of perchlorate-containing chemicals. KMCLLC has endeavored to answer each of your questions to the best of its ability, based upon information that could be obtained in the time allowed for KMCLLC to respond.

We are continuing research on the historical ownership and operations of KMCLLC's Henderson, Nevada facility, including the role of the federal government in the period 1945-62. For instance, it appears that during this period the United States Navy played a significant role in ownership and operation of a plant for production of ammonium perchlorate and that a senior naval officer was assigned to this facility until 1962. KMCLLC reserves the right to amend or supplement its answers based upon the fruits of ongoing research.

**1. What year did production of perchlorate-containing chemicals begin?**

At Henderson, Nevada, production of potassium perchlorate began in 1945, and production of ammonium perchlorate began on a pilot scale basis in 1948, with full commercial scale production beginning in 1951. Also, production of sodium perchlorate began in 1945 for use as a precursor in production of potassium perchlorate.

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**2. What entities have owned/operated the plant? Please provide the dates when ownership or operating control changed.**

KMCLLC's Henderson facility was originally owned and constructed by the Defense Plant Corporation (DPC) acting for the U.S. government in 1941. From August 1942 until November 1944, the plant was operated by Basic Magnesium Incorporated on behalf of the U.S. government to manufacture magnesium that was used in aircraft production. The magnesium plant closed in November 1944, and the federal Reconstruction Finance Corporation (RFC) assumed control of the plant from the DPC. The RFC relinquished custody of the plant to the federal War Assets Administration in October 1946. In June 1949, most of this overall industrial complex was transferred to the Colorado River Commission (CRC), an instrumentality of the State of Nevada. As noted below, the CRC conveyed a portion of the site to Western Electro Chemical Company (WECCO) in 1952. The United States apparently retained or regained ownership of a substantial portion (290.33 acres) for which it did not relinquish ownership finally until March 1962, when this acreage was conveyed to the American Potash and Chemical Corporation (AP&CC).

WECCO was the first privately owned company to operate on the site that was to become the KMCLLC facility. It operated at the site from approximately 1945 through 1955. In May 1945, WECCO contracted with the DPC for the production of perchlorates for the U.S. Department of the Navy. Operations began by June or July 1945, but ceased right after the war's end in August 1945. Subsequently, WECCO resumed operations under a lease from the RFC in February 1946. WECCO acquired portions of the site from the CRC in May 1952.

As previously noted, the U.S. Navy remained active at the site until 1962. Apparently, the Navy spent \$8 million to construct an ammonium perchlorate plant at the site in an area separate from the WECCO-owned chlorate and perchlorate units that were converted from the WW II plant, and it was this plant that was used by KMCLLC to produce ammonium perchlorate. WECCO, and then AP&CC, operated this plant under contract for the Navy, which apparently retained ownership and a supervisory role through a Navy Captain assigned to the site. It is likely that this plant occupied the 290.33 acres for which the United States finally relinquished ownership in 1962.

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In 1955, WECCO was merged with AP&CC, and the merged entity continued the production of chlorates and perchlorates. KMCLLC acquired the present facility from AP&CC in 1967 by means of a merger.

**3. Which specific perchlorate-containing compounds were manufactured?**

Sodium perchlorate, potassium perchlorate, ammonium perchlorate, and magnesium perchlorate.

**4. What was the total annual production of perchlorate-containing compounds at the plant in Henderson, Nevada? What was the annual production of each specific perchlorate-containing compound?**

See Attachment 1. Figures are not readily available for potassium perchlorate production or ammonium perchlorate production between 1945-1951. Also, as previously noted, sodium perchlorate manufacture began in 1945 as a precursor to the production of potassium perchlorate. No separate production figures exist for such precursor sodium perchlorate. KMCLLC began manufacture of sodium perchlorate for end uses in 1968.

**5 & 6. What were the end uses of the perchlorate-containing compounds and what was the approximate percentage of production sold for each of the end uses?**

a. Sodium perchlorate -- precursor to potassium and ammonium perchlorate, and explosives.

b. Potassium perchlorate -- solid rocket fuel oxidizer, flares, and pyrotechnics.

c. Ammonium perchlorate -- solid rocket fuel oxidizer, explosives, chemicals and pyrotechnics.

d. Magnesium-perchlorate -- military batteries.

End-use information for 1997 is deemed to be reasonably reflective of historical uses. In 1997, 87% of production went for use as rocket fuel; 8% for

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use in explosives, and 5% as a chemical feedstock. Historic use in flares and pyrotechnics would have been relatively small.

**7. Please provide the name and address of each entity to whom perchlorate-containing compounds were shipped each year from the Kerr-McGee facility (more than 500 pounds in any year)?**

See Attachment 2. The customer names and addresses furnished reflect KMCLLC shipments from 1978 through the present. Customer records antedating 1978 are not readily available. Normal retention of such sales data by KMCLLC is 10 years.

**8. Please identify the locations of other perchlorate-containing chemical production facilities owned, operated or previously owned or operated by Kerr-McGee in the United States?**

There have been none.

**9. Please provide answers to the above questions (1-7) for any other Kerr-McGee facilities producing or previously producing perchlorate-containing compounds.**

There are none.

**10. EPA has been informed that production of perchlorate-containing compounds in the U.S. is limited to Kerr-McGee and WECCO in Cedar City, Utah (formerly the PEPCON facility in Henderson, Nevada). Please confirm to the best of your knowledge, whether this information is accurate. If you do have knowledge of perchlorate-containing compound production plants in the United States, other than those owned or operated by Kerr-McGee or WECCO, please provide the names, locations and years of operation, if known.**

EPA is correct that production of perchlorate-containing compounds in the U.S. is currently limited to the Henderson facility and the Cedar City, Utah facility operated by American Pacific. In addition to the former PEPCON facility in Henderson, which operated from 1958 to 1988, Kerr McGee knows of four

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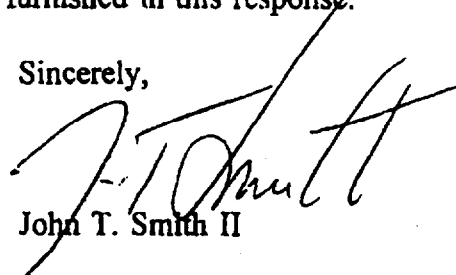
other facilities that have produced perchlorate compounds. (The dates for production at these facilities are estimates.). They are:

1. Western Electro Chemical Company, 1941-48, Los Angeles, California.
2. Hooker Chemicals (now Oxychem), approximately 1940-75, Niagara Falls, New York.
3. HEF, Inc. -- Hooker Chemical & Foote Mineral (now Eka Nobel), 1958-65, Columbus, Mississippi.
4. Pennsalt (Pennwalt), now Elf Atochem, 1958-65, Portland, Oregon.

\* \* \* \*

Again, KMCLLC intends to supplement this response with any additional information that its ongoing research may reveal. Please let me know if EPA has any questions about the information furnished in this response.

Sincerely,



John T. Smith II

Attachments (2)

cc: Douglas Zimmerman, NDEP -- By Federal Express

## ATTACHMENT 2

## Perchlorate Company Names/Addresses

cpa

## Alabama

"Ship to"  
HuntsvilleName/address

Thiokol Corporation

Plant closed.

Current address of related division--PO Box 707, Brigham City, UT 84302-0707

Parrish

Boren Izeco (formerly Gulf &amp; Thermex), 8425 Hwy 269, Parrish, Ala 35580

Redstone

U. S. Army, Redstone Arsenal, Al 35898-5330

Bessemer

Hercules, Inc.

Now Alliant Tech --see Utah Division address

## Arkansas

E. Camden

Atlantic Research Corp., PO Box 1036, Camden, AR 71701

E. Camden

Mining Services International, address not available

Woodbury

Hitech Inc., PO Box 3112, East Camden, AR 71701

Midland

SECO Inc., Austin Powder, 25800 Science Park Dr., Cleveland, O 44122

## Arizona

Goodyear

Unidynamics, 102 S. Litchfield Rd., Goodyear, AZ 85338

Mesa

Talley Defense Systems, Inc., PO Box 849, Mesa, AZ 85211

Tempe

Aerodyne Corp., PO Box 725, Tempe, AZ 85281

Chandler

Aerodyne Corp., PO Box 725, Tempe, AZ 85281

Phoenix

Universal Propulsion, 25401 N. Central Ave., Phoenix, AZ 85027

## California

Aliso Viejo

G. G Industries, PO Box 8065, Laguna Hills, CA 92654

Auburn

Mason Holodyne, 90 Pinecrest Dr., Applegate, CA 95703

Barstow

Roy's Gun and Lock, address not available

Barstow

Mojave Pyrotechnic, address not available

China Lake

Naval Air Warfare Center, 671 Nimitz, China Lake, CA 93555

Edwards AFB

Edwards AFB, CA 93523

Gardena

T.O.P.T.H., 2848 E. 208th St., Long Beach CA 90810

Calif. cont.	
Hollister	Quantic Industries, 990 Commercial St., San Carlos, CA 94070
Hollister	FMC, 900 John Smith Rd., Hollister, CA 95023
Hollister	(formerly Halex) Whittaker Ordnance, PO Box 148, Hollister, CA 95024
Huntington Beach	Milco International, address not available
Ione	M. P. Associates, PO Box 546, Ione CA 95640
Llano	Odco Mfg. Co., address not available
Long Beach	T.O.P.T.H., 2348 E. 208th St., Long Beach CA 90810
Middletown	Reynolds Systems, FMC, PO Box 367, San Jose, CA 95103
Morgan Hill	Olin Corporation, PO Box 727, Morgan Hill, CA 95037
Nimbus	Aerojet Propulsion Division (Gentech), PO Box 1322, Sacramento, CA 95813
Norwalk	Trojan Fireworks, PO Box 2329, Rialto, CA 92376
Ontario	Dynamic Propellant, 4748 Mission Blvd. #D., Ontario, CA 91762
Pasadena	Jet Propulsion Lab, 4800 Oak Grove Dr., Pasadena, CA 91109
Pomona	U. S. Rocket, PO Box 1242, Claremont, CA 91711
Redwood City	Mason Holodyne, 90 Pinecrest Dr., Applegate, CA 95703
Rialto	Astro Pyrotechnics (formerly Trojan Fireworks), PO Box 2329, Rialto CA 92376
Riverside	McKesson Chemical Co., 689 Iowa, Riverside CA 92507
Riverside	Universal Propulsion, 25401 N. Central Ave., Phoenix, AZ 85027
San Jose	Pratt & Whitney (formerly UTC), PO Box 49208, San Jose, CA 95161-9028
Saugus	Hi Shear Industries, 2830 W. Lomita Blvd., Torrance CA 90505
Saugus	Bermite Div., Whittaker Corp., 22116 W. Soledad Canyon Rd., Saugus, CA 91350
Tracy	Lawrence Livermore, U of CA National Lab, PO Box 5001, Livermore, CA 94551
Whittier	Whittier Chemical Co., address not available
Windsor	Starflight Systems, 7714 Bell Rd., Windsor, CA 95492

**Colorado**

Englewood Gateway Safety Products, address n/a  
Penrose Estes Industries, PO Box 227, Penrose, CO 81240  
Whitewater KSI Inc., 1471 Blair Rd. Whitewater, CO 81527  
Colo. Springs Vulcan Systems, PO Box 6099, Colorado Springs, CO 80934

**Florida**

Brooksville Thermex Energy, 13601 Preston Rd., Suite 900 West, Dallas, Tx 75240  
Hollywood CCT, address n/a  
Eglin Eglin AFB, Eglin, FL 32542

**Georgia**

Byron ICI Americas (formerly Pyrotechnic Specialties), PO Box 819, Valley Forge, PA 19482

**Idaho**

Pocatello Firefox Enterprises, 11612 North Nelson Lane, Pocatello, Idaho 83202

**Illinois**

Marion Olin Corp., PO Box 278, Marion IL 62959  
Chicago Harold Dunbar Paper Co., address n/a  
South Beloit Lakeside Fusee, address n/a  
Danville World Fireworks, address n/a  
Danville Star Fireworks, address n/a  
Edwardsville Propeller, PO Box 387, Edwardsville, IL 62025  
Joliet Talley Defence Systems, PO Box 849, Mesa, AZ 85211

**Indiana**

Peru Olin Corp., RR 6 Box 542, Peru, IN 46970  
Kingsbury Melrose Fireworks, PO Box 302, Kingsbury, In 46345  
Kingsbury Aerial Dynamics, PO Box 304, Kingsbury, IND 46345  
Kingsbury Kingsbury Industries, address n/a

**Kansas**

Hallowell Thermex (formerly Gulf Oil), 13601 Preston Rd., Suite 900 W., Dallas TX 75240  
Hallowell Slurry Explosives (formerly El Dorado), PO Box 348, Columbus, KS 66725

<b>Kansas cont.</b>	
Herrington	Hodgdon Powder/ Pyrodex Corp., address n/a
<b>Louisiana</b>	
New Orleans	Bartlett Chemicals, address n/a
<b>Michigan</b>	
Ishpeming	Ireco Inc., 11th Floor Crossroads Tower, Salt Lake City, U 84144
<b>Mississippi</b>	
Foxsworth	Rebel Fireworks, Inc., address not available
<b>Maryland</b>	
Indian Head	Naval Surface Warfare Center, 202 Strauss Ave., Indian Head, MD 20640
Elkton	Thiokol Corp., PO Box 241, Elkton, MD 21922
Elkton	New Jersey Fireworks, Mfg., address n/a
Cumberland	Alliant Tech (formerly Hercules, Inc.), current address W. Va.
Easton	Samuel Jackson Fusee Co., address n/a
Silver Springs	Naval Surface Warfare Center, 10901 New Hampshire Ave., Silver Springs, MD 20903
<b>Minnesota</b>	
Biwabik	Thermex Energy, 13601 Preston Rd., Suite 900 W., Dallas, TX 75240
Biwabik	Nitrochem Energy Corp., PO Box B, Biwabik, Minn 55708
Gilbert	Cook Slurry, Cook Associates, 2026 Beneficial Life Tower, 3650 State St., SLC, Utah 84111
Foley	Aerial Arts, 18355 165th St NE, Foley, Minn 56329
<b>Missouri</b>	
Joplin	Atlas Powder, PO Box 87, Joplin, MO 64801
Joplin	ICI, PO Box 819, Valley Forge, PA 19482
Atlas	Atlas Powder, PO Box 87, Joplin, MO 64801
<b>New Jersey</b>	
Newfield	Shieldalloy Corp., 12 West Blvd., PO Box 768, Newfield, NJ 08344-0768
South Plainfield	Hummel Croton, Inc., PO Box 250, So. Plainfield, NJ 07080
Boonton	Standard RWY Fusee Co., address n/a

**New Jersey cont.**

Orange

H. Reisman Corp., 377 Crane St., Orange, NY 07051

Newark

Fairmount Chemical, address n/a

**Nevada**

Sparks

Hi Shear Industries, 2830 W. Lomita Blvd., Torrance CA 90505

Las Vegas

Aerotech/ISP, 1955 S. Palm, Suite 5, Las Vegas, NV 89104

Lockwood

Largo Marsino, Defense Supply, 204 Edison Way, Reno, NV 89502

Femley

BOKMA Resources, PO Box 590, Femley, NV 89408

**New Mexico**

Roswell

Longhorn Mfg. Co., address not available

*70 Lemay Dr. Roswell, NM 88201***New York**

Brooklyn

Witco Chemical Corp., 700 Court St., Brooklyn, NY 11231

Delanson

Fireworks by Gucci, One Gucci Lane, Brookhaven, NY 11719

**North Carolina**

McCleansville

Gulf Oil, Po Box 183, McCleansville, NC 27301

Riegelwood

Wright Chemical, Atlas Powder, PO Box 271, Tamaqua, PA 18252

**North Dakota**

Fargo

Starr Display Fireworks, PO Box 9574, Fargo, ND 58106

Kindred

Dakota Pyrotechnic, 16250 57th S. E., Kindred, ND 58051

Harwood

Starr Display Fireworks, PO Box 9574, Fargo, ND 58106

**Ohio**

Columbus

G. F. Smith Chemicals, PO Box 245, Powell, Ohio 43065

Cincinnati

Fanaco Inc., address n/a

Steubenville

Barium &amp; Chemicals, address n/a

Fostoria

Standard RWY Fusee Co., address n/a

Marietta

Servo Dynamics, sec Corpus Christi address

Lisbon

Hilltop Energy Inc., An/Gel International, 33 C. St., Salt Lake City, U 84103

**Pennsylvania**

Hatfield Aerial Arts, 18355 165st NE, Foley, Minn. 56329

Telford Service Chemical Inc., address n/a

Tamaqua Atlas Powder Co., PO Box 271, Tamaqua, PA 18252

Mt. Carmel Explo-Tech, Inc., An/Gel Int., 33 C. St., SLC, U 84103

Kittanning KESCO Inc., PO Box 95, Adrian, Pa 16210-0095

**South Carolina**

Columbia Phillips Components, 6071 St. Andrews Rd., Columbia, SC 29212

**Tennessee**

Toone Kilgore Corp., Kilgore Drive, Toone, TN 38381

Louisville Southwestern Energy, An/Gel International, 33 C. St., SLC, U 84103

**Texas**

Karnack Thiokol Corp.  
Plant closed--see address for Utah division

Corpus Christi Servo Dynamics, Inc., Rt. 1, Box 132 E. Roddfield, Corpus Christi, TX 78414

McGregor Alliant Tech (formerly Hercules, Inc.)  
Plant closed--see address for Utah division

Kennedale Harrison Jet Guns, 6915 Hudson Village Creek Rd., Kennedale, TX 76060

Mansfield Shaped Charge Specialties, address not available

Marshall RTF Enterprises, address n/a

Rosharon Slumberger, PO Box 1590, Rosharon, TX 77583

Houston Thermex (formerly Gulf), 13601 Preston Rd., Suite 900 West, Dallas, TX 75240

Waco M & M Chemical, 103 Stovall, Waco TX 76706

**Utah**

Magna Alliant Tech, PO Box 98, Magna UT 84044

Brigham City Thiokol Corporation, PO Box 707, Brigham City, UT 84302

Logan Fireworks West, address n/a

Lehi Dyno Nobel (formerly Ireco), 11th Floor, Crossroads Tower, Salt Lake City, UT 84144

Lehi Western States Energy, Atlas Powder, 15301 Dallas Parkway, Suite 1200, Dallas, TX 75248

**Utah cont.**  
Ogden Defense General Supply, 8000 Jefferson Davis Hwy, Richmond, VA 23297  
Ogden A & B Chemical Co., 2931 Second Ave., Suite 100, Richmond, VA 23222  
Utah County Dyno Nobel, formerly Cook Associates, 2026 Beneficial Life Tower, Salt Lake City, UT 84111  
Salt Lake City Hanex Products, 466 W. 200 South, Salt Lake City, UT 84101

**Virginia**  
Richmond 2931 Second Ave., Richmond VA 23222  
Gainesville Atlantic Research, 5945 Wellington Rd., Gainesville, VA 22065  
Pepper Hercules, Inc. (see Alliant Tech Utah address)  
Yorktown Defense General Supply, 8000 Jefferson Davis Hwy, Richmond, VA 23297  
Duffield Paige Ireco (formerly Gibson Explosives), PO Box 33, Duffield, VA 24244

**Washington**  
Olympia Ireco Inc. (formerly Pacific Powder), 628 Columbia NW, Suite 1-A, Olympia, WA 98501

**West Virginia**  
Rocket Center Alliant Techsystems, 210 Star Route 956, Rocket Center, WV 26725  
Newell Newell Specialties, State Route 2, Newell, WV 26050  
Romney Appalachian Explosives, An/Gel Int., 33 C St., Salt Lake City, UT 84103

**Wisconsin**  
Delafield Bartolotta Fireworks, PO Box 5, Genesee Depot, WI 53127

**Wyoming**  
Mills Thermex (formerly Gulf), 13601 Preston Rd., Suite 900 West, Dallas, TX 75240

## ATTACHMENT 1

Perchlorate Chemical Production - Henderson, NY 1951-1997

4/3/98

YEAR	PRODUCT			
	SODIUM PERCHLORATE	AMMONIUM PERCHLORATE	MAGNESIUM PERCHLORATE	POTASSIUM PERCHLORATE
1951	-	379	-	3,077
1952	-	1,218	-	3,805
1953	-	1,571	-	3,562
1954	-	3,974	-	158
1955	-	3,239	-	651
1956	-	3,738	-	490
1957	-	3,427	-	336
1958	-	6,746	-	309
1959	-	10,888	-	378
1960	-	5,600	-	150
1961	-	10,279	-	122
1962	-	8,511	-	206
1963	-	11,220	-	117
1964	-	9,240	-	222
1965	-	3,841	-	-
1966	-	6,511	-	161
1967	-	8,456	-	304
1968	113	5,893	-	465
1969	71	5,001	12	535
1970	375	7,692	8	516
1971	142	3,835	-	344
1972	61	7,578	180	463
1973	75	6,781	247	526
1974	62	6,163	249	768
1975	41	4,443	42	266
1976	142	5,152	(8)	763
1977	418	5,857	-	949
1978	333	5,151	-	762
1979	804	6,542	-	830
1980	1,383	6,282	-	524
1981	1,567	6,174	-	386
1982	942	7,075	-	359
1983	841	8,531	-	(2)
1984	1,356	12,366	-	-
1985	1,878	14,116	-	-
1986	1,259	14,758	-	-
1987	1,061	14,053	-	-
1988	1,346	15,368	-	-
1989	262	18,033	-	-
1990	279	18,478	-	-
1991	356	10,803	-	-
1992	472	7,179	-	-
1993	734	8,920	-	-
1994	829	10,919	-	-
1995	681	8,010	-	-
1996	684	4,214	-	-
1997	735	5,303	-	-

**Perchlorate Production from Keer McGee and American Pacific Records**

	Kerr McGee				American Pacific	
Production Year	Sodium	Ammonium	Magnesium	Potassium	Ammonium	Sodium
1951		379		3077		
1952		1218		3605		
1953		1571		3562		
1954		3974		168		
1955		3239		651		
1956		3738		490		
1957		3427		336		
1958		6746		309		
1959		10888		378	1214	
1960		5600		150	2500	
1961		10279		122	3900	
1962		8511		206	8275	
1963		11220		117	15306	
1964		9240		222	11780	
1965		3841			3795	
1966		6511		161	6095	

1967		8456		304	3450	
1968	113	5893		465	2070	
1969	71	6001	12	535	5427	
1970	375	7692	6	516	4256	
1971	142	3835		344	10768	
1972	61	7576	180	463	11730	
1973	75	6781	247	526	8855	
1974	162	6163	249	768	6900	
1975	41	4443	42	266	4370	
1976	142	5152		763	3565	
1977	416	5857		949	3910	
1978	333	5151		762	3816	
1979	804	6542		830	5000	
1980	1383	6282		524	5154	
1981	1567	6174		386	8571	
1982	942	7075		359	13333	
1983	841	8531			13551	
1984	1366	12366			13736	
1985	1878	14116			14600	
1986	1259	14758			13981	56

1987	1061	14053			14344	112
1988	1346	15368			9649	56
1989	262	18033				
1990	279	18478				
1991	356	10803				
1992	472	7179				
1993	734	8920				
1994	829	10919				
1995	681	6010				
1996	684	4214				
1997	735	5303				
Totals	19410	358506	736	22314	233901	224

Non-proprietary Propellant Formulations

**Space Shuttle Main Grain TP-H1148**

Approximate % wt.

HB Polymer (Epoxy)	12
ECA (Epoxy Curing Agent)	2
Aluminum	16.0
Iron oxide	0.3
Ammonium Perchlorate	69.7

**Minuteman III Stage 1 TP-H1011**

Aluminum	15-20
Ammonium Perchlorate	65-75
HB polymer	10-15
Epoxy polymer (curative)	>5

**D-5 WAK-2**

Nitroglycerine	17
2-nitrodiphenylamine	2
N-methyl-p-nitroaniline	
Nitrocellulose	
Triphenolbismuth	
Polyethylene Glycol	6
Ammonium Perchlorate	11
Aluminum	19
HMX	45

## **Titan**

Ammonium Perchlorate	68
Aluminum	16
Polymer binder	16
Iron Oxide	< 1